ARGONNE NEWS
Monday, June 22, 1998
ARGONNE NATIONAL LABORATORY

Neutrino oscillation confirmed by Soudan 2

Independent observations of "neutrino oscillations" have come from an experiment being conducted by Argonne researchers in collaboration with other physicists from the United States and England.

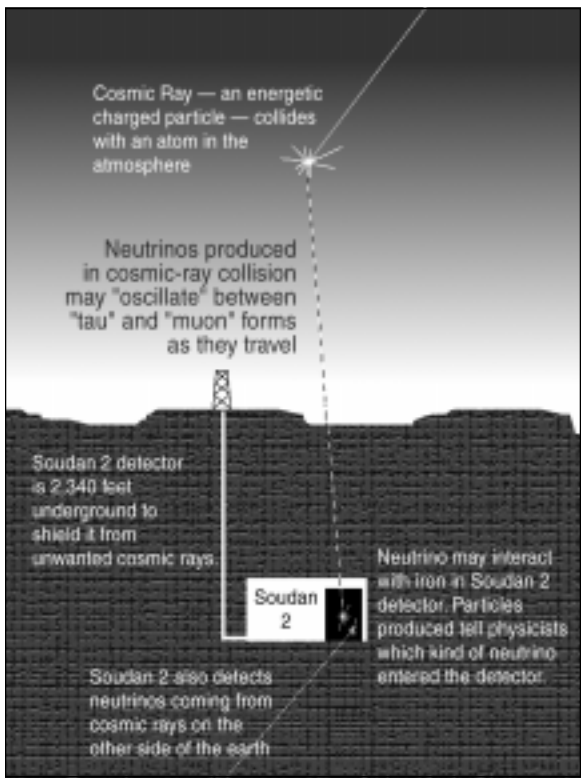
These preliminary findings of the Soudan 2 experiment support the discovery of neutrino oscillations recently announced by researchers at Japan's Super-Kamiokande detector.

Neutrinos are among the most fundamental particle building blocks of matter and may some day provide a unique window on the universe. However, they have been notoriously difficult to study because they rarely interact with ordinary matter. Neutrinos can oscillate — spontaneously change from one type to another — only if they have mass. Current theory calls for three types: the electron, muon and tau neutrinos. Past experiments have concluded that all neutrino masses are too small to be measured directly, and may be zero. The oscillation phenomenon allows experiments to probe much smaller masses than can be measured directly.

The discovery of neutrino oscillations could provide a new tool which will dramatically increase physicists' knowledge over the next few years. For example, the current theory of energy and matter in the universe, the "Standard Model," considers neutrinos to be completely massless. Measurements of neutrino masses in oscillation experiments would provide the information needed to expand the Standard Model and shed new light on the nature of mass.

Neutrinos produced by distant stars and galaxies may soon be recorded by "neutrino telescopes" here on Earth, and interpretation of their observations will require a knowledge of oscillations.

Finally, neutrinos produced during evolution of the universe, immediately after the Big Bang, are still all around us. With 300 neutrinos per cubic centimeter everywhere in the universe, even very small neutrino masses could contribute to the "dark matter" problem of cosmology. Small neutrino masses could even have had a profound effect on the early development of the universe itself.



Soudan

The Soudan experiment is a massive particle detector located in a historic iron mine, a half-mile below the rolling hills of northeastern Minnesota. Physicists at both Soudan and Super-Kamiokande (often called Super-K) are studying cosmic-ray neutrinos produced in the earth's atmosphere that travel down through the few thousand feet of rock above the instruments — and upwards through the 8,000 miles of planet Earth beneath them.

Soudan is the only operating cosmic-ray neutrino detector in the United States. Unlike Super-K, a stainless-steel chamber filled with 12.5 million gallons of water and lined with sensitive light detectors, Soudan comprises 960 tons of iron plates honeycombed with more than 1,500,000 "drift tubes" that detect charged particles.

Although Soudan is much smaller, and therefore observes far fewer neutrino interactions than the Super-K detector, its observations are significant because its design is radically different from the Japanese device. The Soudan detector can measure the directions and energies of incoming neutrinos precisely; this capability can be particularly valuable for the study of oscillations.

The Soudan experiment, named after the small town where the mine is located, has been designed, built and operated by Argonne, the University of Minnesota, Tufts University, and England's Rutherford Appleton Laboratory and Oxford University. The device was designed to determine whether protons, the positively charged particles that make up part of every nucleus in every atom of the universe, will eventually decay into other particles. As the search for proton decay continued, with Soudan and other underground detectors, it soon became apparent that the cosmic-ray neutrino interactions, predicted to be the main background to proton decay, were very different from theoretical predictions.

Although the search for proton decay has so far come up empty, the detectors built to discover it have found plenty of exciting physics to do with cosmic ray neutrinos.

Preliminary findings from the most recent Soudan neutrino studies were presented at Neutrino '98, the same conference that featured the Super-K results. As in their earlier reports, physicists from both groups found fewer "muon" neutrinos than expected, suggesting that some of them had changed into another type, perhaps "tau" neutrinos.

A consistent picture of neutrino oscillations is emerging from the two independent experiments with very different types of detectors. The preliminary Soudan results were reported at the conference, and are available in the proceedings on the World Wide Web at http://www-sk.icrr.u-tokyo.ac.jp/nu98/.

(Continued on page 3)

Credit Union plans ANL-W open house

Argonne Credit Union will hold an open house at Argonne-West Friday, July 10.

President Marite Plume and credit union officers will be on site to get acquainted with Argonne-West employees and answer questions about the credit union. Employees will also be able to meet Larry Kurek (OCF), newly elected chairperson of the credit union's board of directors, and Jerry Ward (RPS), representative on the board of directors from Argonne-West.

Information tables will be set up in the foyer of the Laboratory and Office building between 9:30 a.m. and 3:30 p.m. Refreshments will be served, and prizes will be awarded.

New Web page eases creation of e-mail 'aliases'

Employees can change or simplify their e-mail addresses by visiting a new World Wide Web page at http://www.anl.gov/alias/.

"Any employee can create an e-mail alias — a simple, easy-to-remember and easy-to-communicate e-mail address — that is more personal than the actual system address," said Fred Moszur (ECT). "You should create an alias that is distinctive and easy for colleagues or clients to remember."

One example is the Argonne News e-mail address: info@anl.gov.

The alias page, created by Argonne's Electronics and Computing Technologies Division, provides a simple online form that lets employees create and register e-mail aliases. The new web-based interface and its fill-in-the-blank design should enable even novice computer users to register e-mail addresses without requiring a lot of help.

Argonne-East honored for recycling, waste reduction efforts

Argonne's intensive recycling efforts have been recognized by the Illinois Recycling Association, which awarded the laboratory an honorable mention in the category of "Outstanding Government Recycling Program."

The Illinois Recycling Association encourages the responsible use of resources by promoting waste reduction, reuse and recycling. It is a statewide association of businesses, government solid waste and recycling coordinators, non-profit organizations, educational institutions and individuals.

The award recognizes the efforts made across all areas of the laboratory. Many different divisions and departments contributed to the various activities identified within the original nomination submitted by Argonne-East's Waste Minimization and Pollution Prevention program, managed within EMO-WM. Some of the projects recognized by the Illinois Recycling Association were:

■ Argonne-East recycled more than 560 tons of mixed office paper, a quarter-million pounds of scrap metal and 17 million pounds of construction and demolition wastes in fiscal year 1997. Combined, these efforts saved the laboratory $128,500 over the cost of disposal.

■ More than 87,000 pounds of surplus computer equipment was removed from the waste stream; surplus computer tapes were recycled, and a printer toner cartridge program put in place.

■ Fly ash from the laboratory's boiler house is recycled, reducing disposal costs.

■ Argonne-East trucks use retread or recapped tires. Refined motor oil and recycled antifreeze are used in laboratory vehicles.

■ The laboratory sponsors activities like "America Recycles Day," increasing awareness of recycled products; a forest preserve cleanup day; Earth Day activities, and a "recycled toy drive" benefitting the kids of Chicago's West Garfield Park neighborhood.

Argonne In The News

Examples of some of the dozens of articles about Argonne printed in the media each month.

Chicago Tribune

Monday, April 13, 1998, Page 1

Tribune photo by Todd Panagopoulos

Asithan Yener (left), a professor at the University of Chicago's Oriental Institute, and Esen Ercan Alp, a physicist at Argonne National Laboratory, discuss the figurine to be analyzed.

Argonne taps relic's ancient secrets

Lab's X-ray reveals 5,000-year-old skills

By William Mullen
Tribune Staff Writer

On a recent night at the Argonne National Laboratory in DuPage County, a piece of the world's newest technology was brought to bear on some of its oldest.

Inside a lead-lined room lay a metal figurine—11 inches tall and 5,000 years old—that represents the dawning of a new age in ancient technology. Learning more about the making of the oldest tin bronze object ever found will help tell the story of some of the earliest human discovery.

Nearby, scientists huddled around a computer screen in a lab attached to Argonne's billion-dollar, 3-year-old X-ray machine, the Advanced Photon Source. By remote control, the scientists bombarded the figurine with electrons traveling at 99.97 percent the speed of light.

In scanning the figurine, the beam unlocked secrets about the object's composition and genesis—lessons that could be invaluable in helping the modern world learn about man's early use of metals.

And by the time the night was over, the scientists present were convinced they had just used the greatest new tool in archeology since the 1949 invention of radiocarbon dating. Within hours, it gave

Sun Figurine, Back Page

Shedding light on the mysterious actions of protons.

thousandths of a second, but in those brief instants, measurements were completed that are leading physicists to reexamine long-held ideas about the inner structure of atoms.

The achievement was reported last week in the journal Physical Review Letters by a team of scientists from Argonne, the University of Edinburgh in Scotland, the University of Maryland, Oak Ridge Associated Universities, the University of Tennessee and the University of Milan in Italy.

The nuclei of nearly all atoms consist of combinations of protons, which have electrically positive charges, and neutrons, which have no charge. The number of protons in a nucleus defines the element to which it belongs; for example, hydrogen has 1 proton, uranium has 92, and the other elements found in nature have intermediate numbers.

When 1 nucleon contains roughly equal numbers of protons and neutrons it is generally stable, that is, it does not decay radioactively. But if there is a large imbalance between protons and neutrons, the nucleus is generally unstable and undergoes fission (splitting) and the radioactive loss of particles.

The most common of these radioactive emissions are alpha particles (identical to helium nuclei, containing two protons and two neutrons), beta particles (electrons and positrons) and gamma rays. But in 1970 an unknown form of nuclear radioactivity was discovered: a decay process that emits single protons.

The prevailing opinion of nuclear physicists is that the protons and neutrons inside most atomic nuclei arrange themselves in concentric "shells" somewhat analogous to the electron shells that orbit the nucleus.

Scientists also believe that the nuclei of most atoms are more or less spherical, and theoretical models based on this assumption match most experimental measurements fairly closely. But two types of nuclei created in the Argonne experiments have revealed features that are inconsistent with the spherical shell model. Dr. Cary N. Davids of the Argonne laboratory said these nuclei must be regarded as grossly deformed—not spheres, but prolate spheroids — little footballs. Their radioactive decay is accompanied by the emission of single protons.

The loss or gain of a proton converts an atom into another element: if a gold atom were to lose one of its 79 protons, it would become a platinum atom, with 78 protons.

The spherical shell model fairly accurately predicts the energies of protons emitted by unstable isotopes (forms) of nuclei containing between 50 protons (tin atoms) and 82 protons (thallium). But for unstable proton-containing isotopes of elements from M (antimony) through W (holmium), the spherical shell model yields inaccurate predictions.

In the Argonne experiments, scientists used an accelerator firing beams of heavy atoms into atomic targets to create two special isotopes that decay radioactively by emitting protons: holmium-141 and europium-131, two of the elements known as rare earths. During the few thousandths of a second these atoms survive, a special instrument called a fragment mass analyzer sorts them out according to mass, allowing scientists to identify their properties.

The energies of the protons thrown off by these decaying nuclei, the experimenters found, were not consistent with the spherical model but fit another model developed a decade ago by two Russian theorists, V. P. Dzgrov and S. G. Kadmensky. Their model envisions a deformed, football-shaped nucleus for certain unstable atoms, from which a single proton can escape in a quantum mechanical process called tunneling.

Tunneling is an astonishing but universal process whereby a particle can approach an apparently impenetrable barrier, disappear and reappear on the other side. Many electronic devices depend on tunneling.

The protons inside an atomic nucleus are affected by their mutual electromagnetic repulsion and the strong nuclear force that holds them together inside the nucleus.

In the case of certain unstable nuclei, the forces interact to allow single protons to tunnel through the barrier confining them within the nucleus and escape. But theory predicts that the tunneling rate for protons escaping from football-shaped nuclei should be different from the rate of protons tunneling out of spherical nuclei. The Argonne team demonstrated just this difference in tunneling rates, thereby supporting the Blatov-Kadmensky theory.

"We hope the theorists will look at this," Dr. Davids said, "and come up with a better model to improve our understanding of the quantum mechanics of tunneling through a deformed barrier."

NEW YORK TIMES
NEW YORK, NY
TUESDAY 1,148,190
MAR 10 1998

Glimpse of Abnormal Nuclei Alters Views on Atomic Structure

By MALCOLM W. BROWNE

PHYSICISTS at Argonne National Laboratory in Illinois say they believe they have created some freakish atomic nuclei that are shaped like footballs and eject protons during their death throes to produce a very rare form of radioactivity.

The atomic nuclei created in the experiments survived for only a few

Radioactive Decay

The nuclei of common atoms contain roughly equal numbers of positively charged protons and neutral neutrons, but some atoms contain imbalances and easily break apart, producing radioactivity. Until 1970, only three types of radioactive decay were known, shown in the bottom drawings. But in 1970, a rare form of radioactive decay was discovered, in which the nucleus emits a single proton, at top. Scientists believe they have now created such football-shaped nuclei.

PROTON DECAY (atomic nucleus) → PROTON

ALPHA DECAY (SPHERICAL NUCLEUS) → ALPHA PARTICLE

BETA DECAY → ELECTRON

GAMMA DECAY → GAMMA RAY

Source: American Institute of Physics

Deformed Nuclei Spit Out Protons

A rare type of radioactive decay can signal the shape of an atom's nucleus.

By determining the rate at which the unstable nuclei of two elements emit protons, researchers have for the first time obtained experimental evidence that these particular nuclei look more like flattened globes than true spheres.

"We haven't actually measured the deformation, but our results show these nuclei to be highly deformed," says Cary N. Davids of Argonne (Ill.) National Laboratory. Davids and an international team of researchers describe their findings in the March 2 Physical Review Letters.

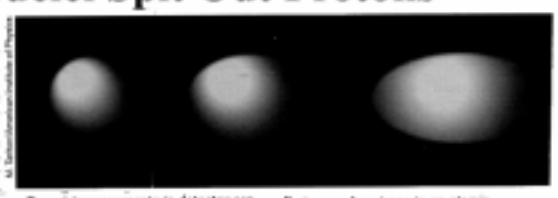
"It's a new example of proton radioactivity and, more than that, an excellent example of the ability to deduce something about the shape of a nucleus from the properties of the decay," says Richard F. Casten of Yale University.

Atomic nuclei are made up of protons and neutrons. Normally, neutrons help prevent the electrostatic repulsion between the positively charged protons from splitting the nucleus apart.

Many nuclei are unstable, however, because they contain too many protons for the number of neutrons present. Such proton-rich nuclei sometimes become more stable by spontaneously ejecting a proton.

In proton radioactivity, a proton deep inside the nucleus penetrates an outer surface shell of protons. To get through the barrier, it takes advantage of a quantum effect known as tunneling.

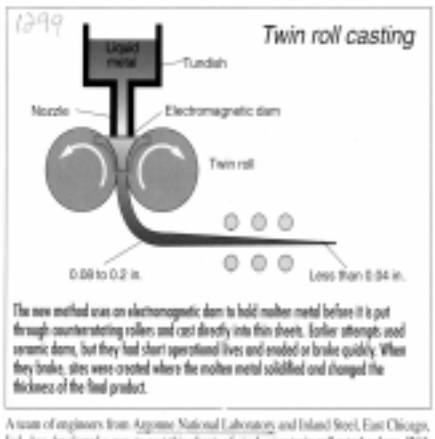
During the last few years, Davids and his colleagues have been smashing stable nuclei together to create unstable, proton-rich nuclei and looking for evidence of proton radioactivity among these short-lived isotopes. Nearly all of their proton decay results were consistent with tunneling out of a spherical nucleus.



Protons and neutrons in an atomic nucleus typically arrange themselves into concentric shells that give it a spherical shape (left). Certain arrangements of protons and neutrons produce a highly deformed shape that has a length about 1.5 times greater than its width (middle). Rapidly spinning nuclei can settle into an even more deformed configuration (right).

SCIENCE NEWS
WASHINGTON, DC
WEEKLY 237,304
MAR 7 1998

New casting method cuts equipment costs by a factor of five



The new method uses an electromagnetic dam to hold molten metal before it is put through counterrotating rollers and cast directly into thin sheets. Earlier attempts used ceramic dams, but they had short operational lives and eroded or broke quickly. When they broke, slots were created where the molten metal solidified and changed the thickness of the final product.

A team of engineers from Argonne National Laboratory and Inland Steel, East Chicago, Ind., has developed a way to cast thin sheets of steel using twin-roller technology. With the new method, capital investment for a new plant with a capacity of 1 million tons will be about $500 million, compared with $2.7 billion for a conventional plant. And energy savings are expected to be as high as 16 million Btus/ton. Sheet-steel quality is also better with the new method.

MACHINE DESIGN
CLEVELAND, OH
24-TIMES/YEAR 180,000
MAY 7 1998

MIAMI HERALD (EL NUEVO HERALD)
MIAMI, FL
MONDAY 101,389
FEB 23 1998

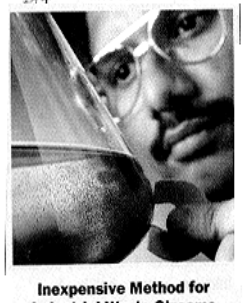
Científicos de Rusia y EU estudian armas bacteriológicas

Argonne —(AFP)— En el laboratorio de Argonne, Illinois, uno de los más importantes de Estados Unidos, un equipo de científicos estadounidenses y rusos estudian los medios para detectar e identificar mejor los agentes bacteriológicos, un trabajo que podría ser útil a los militares.

"Los rusos tienen la materia gris, los estadounidenses el dinero y las instalaciones", opinó un renombrado biólogo ruso, Andrei Mirzabekov, a propósito de esta colaboración.

ENVIRONMENTAL TECHNOLOGY
ATLANTA, GA
BI-MONTHLY 65,000
MAY-JUN 1998

Products-In-Action
Special Focus By ET Staff



Inexpensive Method for Industrial Waste Streams

Argonne National Laboratory has developed an approach for removing metals and radionuclides from waste or process streams. The patented approach utilizes small magnetic, chemically-coated particles which selectively attract specific metals. The coating extracts the low concentration of metal after the particles are dumped into the process or waste solution tank. The particles and captured metal pieces are removed from the solution with magnets. The metal is removed from the particles, allowing the metal and the particles to be recovered while recycling the solution for plant use.

Proposed project would expand on Soudan neutrino research

(Continued from page 1)

MINOS

Experiments with cosmic ray neutrinos, which originate from cosmic-ray collisions with the earth's atmosphere, can provide only limited information about oscillations. Further progress will require the carefully controlled conditions of an accelerator neutrino beam. Such a beam will soon be built at Fermi National Accelerator Laboratory to provide the world's highest intensity source of high energy neutrinos. An experiment using this beam is being designed by high-energy physicists at Argonne, Fermilab and 21 other institutions in the United States, Britain, Russia and China. This experiment, called MINOS (Main Injector Neutrino Oscillation Search), is designed to study in detail the oscillation effects observed at Super-K and Soudan. A new 8,000-ton neutrino detector will be constructed adjacent to the present Soudan detector by Argonne and other MINOS collaborators.

The MINOS neutrino beam will be measured by similar neutrino detectors at Fermilab and Soudan, allowing precise studies of the changes in beam composition caused by oscillations.

When the MINOS experiment is operating, Fermilab's Main Injector will be used to generate a beam of nearly pure "muon" neutrinos aimed at Soudan, into the ground at a three-degree angle toward the north-northwest. To a neutrino, the intervening 453 miles of solid rock are as transparent as window glass. If neutrinos do oscillate, as the Super-K results indicate, the beam arriving at the underground physics laboratory is expected to create signals indicating a significant number of "tau" neutrinos — or perhaps some other type produced by oscillations.

The MINOS neutrino beam will be measured by very similar neutrino detectors at Fermilab and Soudan, allowing precise studies of the changes in beam composition caused by oscillations. In addition, these changes can be maximized by adjusting the beam energy. The experiment should be able to confirm the Super-K cosmic-ray results in a very precise way, and also will be able to identify the type of neutrino produced by the oscillations. It is also expected to provide accurate measurements of the difference between the masses of the oscillating neutrino types.

The MINOS experiment is scheduled to begin construction next year and begin taking data in late 2002.

Seminars

Send seminar listings to Evie Fagan, Building 201, Room 2U-09 (OPA-201). Deadline is 5 p.m. Monday. Seminar listings *only* can be sent by e-mail to efagan@anl.gov. *Note new e-mail address.*

Monday, June 22
Joint Chemistry and Materials Science Divisions Seminar: **"Metal Halide Analogs of Silicates and Phosphates: Flexible, Luminescent, and "Porous" Materials"** by James D. Martin, Department of Chemistry, North Carolina State University, Raleigh. 2 p.m., Bldg. 200, Conference Room J183.

Tuesday, June 23
Energy Technology Division Seminar: **"Materials Science of Concrete — Present and Future"** by Hamlin Jennings, Department of Materials Science, Northwestern University, Evanston. 10:30 a.m., Building 212, Room A157.

Friday, June 26
Materials Science Division Seminar: **"FMR in Fe/Cr Multilayers with Non-Collinear Magnetic Ordering"** by Natalia Kreines, P.L. Kapitza Institute, Moscow, Russia. 11 a.m., Bldg. 223, Conference Room S105.

Monday, June 29
High Energy Physics Division Theoretical Physics Seminar: **"Exactly Solvable Self-Dual Yang-Mills Theory and Applications to Perturbative QCD"** by Gordon Chalmers, SUNY, Stony Brook. 2 p.m., Bldg. 362, Conference Room E188.

Physics Division Seminar: **"Experimental Investigation of Structural Phenomena in N~Z A~60 Nuclei"** by Stuart Vincent, University of Surrey, Guildford, United Kingdom. 3:30 p.m., Bldg. 203, Conference Room R150.

Thursday, July 2
Energy Technology Division Seminar: **"Zeolite-Salt Systems"** by Nikolay Usachev, N.D. Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences, Moscow, Russia. 10:30 a.m., Bldg. 212, Conference Room A157.

Physics Division Theoretical Physics Seminar: **"Few-Body Aspects of the Structure of Light Nuclei"** by Ian J. Thompson, University of Surrey, United Kingdom. 3 p.m., Bldg. 203, Conference Room B221.

Thursday, July 16
Experimental Facilities Division Seminar: **"Non-Interferometric Phase Measurement"** by Keith Nugent, School of Physics, The University of Melbourne, Australia. 4 p.m. Bldg. 401, Conference Room A1100.

Argonne News is published weekly for Argonne employees by the Office of Public Affairs. Send news items to Editor Dave Jacqué, Building 201, Room 2Q-02 (OPA-201). Voice: ext. 2-5582. Fax: ext. 2-5274. E-mail: info@anl.gov. Argonne-West correspondent: Dolores Lagerquist, Bldg. 752, ext. 3-7523. Deadline for all materials is 5 p.m. Monday. Argonne National Laboratory is operated by the University of Chicago for the U.S. Department of Energy. Vol. 51, No. 24.

Radio Club plans annual 'field day'

Employees and the public are invited to watch the Argonne Amateur Radio Club practice emergency communication techniques at its annual "field day" event at Argonne-East June 27-28.

Argonne's hams will be participating in a national event sponsored by the American Radio Relay League. Amateur radio operators in the U.S. and Canada will be set up "emergency communication stations" and attempt to contact as many other stations as possible. Points are tallied for the number and type of contacts.

The field day will be held at the model aircraft field on Tech Road, starting at noon on June 27 and ending 24 hours later.

Guest House plans 'Grillfest'

The Argonne Guest House is inviting employees to dine outdoors on the terrace during "Grillfest," on Wednesday, June 24, and Thursday, June 25, from 5 p.m. to 8 p.m.

The special dinners feature a selection of seasonal specialties grilled outdoors. Entrees include T-bone of veal, swordfish with corn and cucumber salsa, barbecued salmon, buffalo rib-eye with portobello mushroom sauce, and others. Appetizers and desserts will be available.

Reservations are accepted, but not required: dial 5, then 0, or (630) 739-6000.

Classified Ads

ARGONNE-WEST

OPPONENT — Opponent for tennis games, during lunch at lab. intermed level. John Conway, (219) 937-2513.

MISCELLANEOUS

BEDROOM SET — Head/foot board, 2 night stands, dresser, mirror, chest of drawers & lamps. $375. Jim Oprzedek, (773) 586-0044.

MISCELLANEOUS — Air compressor, 20 gal., originally used for temperature control but great for a shop, nailers, ratchets, etc. $175. ShopSmith saw, drill press & lathe, all-in-one tool, like new, instruction manuals included. $650. Lee Welko, (630) 257-9262.

FURNITURE — Glass coffee & end table. $150/both. Jan Buckley, (708) 301-6169.

MISCELLANEOUS — Fold away, bike exercise equipment. $40. Yvette Collazo, (630) 428-4191.

FURNITURE — 2-piece sectional sofa, seats 5, 3 years old, very good condition, picture available. $170 o.b.o. Alessandra Klimara, (815) 744-0269.

FISHER-PRICE ITEMS — Dream doll house w/accessories. $30. All-in-one kitchen w/accessories. $30. Bill Luck, (847) 559-0590.

SAILBOAT — 1976 Islander 30, Atomic 4 gasoline engine, fully equipped. Make offer. Robbie Dalton, (630) 920-8412.

JACKET — Ladies, Classic Motorcycle LE jacket, large, black, never worn. $100. George Muszynski, (773) 734-0821.

MISCELLANEOUS — 12" Panasonic black/white TV, works well. $10. Sunbeam pie maker, hardly used. New $30 - asking $15. Dust Buster. $10. Hank Craft steam vaporizer. $5. Sun Beam electric mixer, stainless steel. $50. Paul Kurpis, (630) 971-1322.

AREA RUG — 9' x 12', Aubusson by World Carpets, 100% heat-set nylon, royal blue pattern, good condition. $100 o.b.o. James Kotora, (708) 352-7435.

TIRES — 2, Raised letter Goodyear Eagle LS, P235/70 R 15, good condition. $15/each. Jim Oprzedek, (773) 586-0044.

ESTATE AUCTION — June 27, 2529 Dougal Road, Joliet, just off route 30, west of New Lenox in Cherry Hill area. Books, furniture, tools, appliances. Edward Ryan, (630) 355-6149.

PRINTER — IBM Proprinter, 24-pin dot matrix. $50. Walter Lipinski, (630) 985-5245.

MOUNTAIN BIKE — 10-speed, Magna Outreach, blue, like new. $75. Maria Addison, (630) 257-0092.

BEANIE BABIES — Hoot, Doodle. $40/each. Goldie, Inky, Spooky, Velvet. $30/each. Blizzard, Valentino. $25/each. Legs, Waddle. $20/each. Teenie set. $120. More. Peter Washburn, (630) 968-5383.

GARAGE SALE —June 19 & 20, 8 a.m. - 4 p.m., 3051 Willardshire Road, Joliet. Bruce Stejskal, (815) 436-2773.

WATER BED — King size, frame, liner, heater & mattress. Best offer. Lynn Labno, (815) 834-1781.

SAW — Sears Craftsman, 10", 2.5 HP, electronic radial arm saw w/heavy duty stand. $200 o.b.o. Sam Giordano, (815) 469-2332.

Classified ad request forms are available in stockrooms, at the Office of Public Affairs in Building 201, and at Argonne-West's Building 752, Room D109. The old half-sheet forms are acceptable, but note that the deadline is incorrect. Deadline for classified ads is **5 p.m. Monday.**

Requests can be submitted by fax to ext. 2-5274, or by inter-office mail to Evie Fagan, Building 201, Room 2U-09 (OPA-201). A drop-off box is located at the *Argonne News* office, Building 201, room 2Q-02 and at 2U-09.

Request forms must be signed and must include a home phone number. Ads cannot be accepted by phone or electronic mail. Please limit ads to 25 words; longer ads may be edited. Housing listed for sale or rent is available without regard to race, creed, color or national origin.

Argonne-West employees are welcome to submit classified ads to *Argonne News*. Request forms are available at the office of Argonne-West Correspondent Dolores Lagerquist, Building 752, Room D109. When completed, fax the request form to the *Argonne News* office at (630) 252-5274.

MISCELLANEOUS — Selkirk paperweight, signed & numbered. $75. Robert Fabe signed & number print "Spring Day," not framed. $20. Beanie Babies: Doodle, Legs, Twigs & Spike, 2, Goldie & Pugsley. $140. Trampoline, 42" round. $40. Exercising poles w/2 videos. $10. Martha Teitlus, (708) 233-2654.

MISCELLANEOUS — Reverse Osmosis water purifier. $50. Water softener. $100. Gas range. $400. Nicholas Sereno, (630) 548-2654.

COMPUTER — 486 w/overdrive processor, 14.4 modem, 540 meg hd, 16 Meg RAM, Win95 & Office 95, 15" color monitor. $500. CD-ROM & sound card available. Elsie Brown, (630) 734-1780.

COMPUTERS — 2, Compaq Elite laptops, 486/75 mhz, 16 meg ram, 340 meg/hd, pcncia modems, color display panel & onboard trackball, Win95 & Office 95 installed. $400/each. Elsie Brown, (630) 734-1780.

FURNITURE — Ethan Allen, Queen Anne, traditional, sofa, 2 barrel chairs, wing chair, cane chair, light mauve/dark green/soft green, excellent condition. Cherry wood sofa table, 2 end table & mini chest, excellent condition. Reasonable. Jacquie Habenicht, (815) 834-1422.

BEANIE BABIES —Snowball (retired), & 1997 Holiday Teddy (retired), Mint condition. $50/each. Gobbles. $25. William Sullivan, (630) 257-2176.

FURNITURE — Dinette set, maple & laminate, w/4 maple chairs, good condition. $125. William Sullivan, (630) 257-9026.

BARBIE — 1997 Harley Davidson collectible Barbie, never opened, mint condition. $250 o.b.o. William Sullivan, (630) 257-2176.

FURNITURE — 39" x 21" x 81", honey pine entertainment armoire, holds up to 27" TV. $450. Ihor Hlohowskyj, (630) 964-1691.

MISCELLANEOUS — 1997 Fedders air conditioner, 6K BTUs, used only one summer. $150. Computer, AMD K6-233MMX, 64 MB RAM, 3.2 GB WD HD, FD, 24 x CD-ROM, 16 bit, 3D sound & speaker, Win95. $800. Carl Nelson, (815) 886-9386.

TAPING — 4' x 8' sheet, 4' x 10' or 4' x 12'. $11/each. Tony Rodriguez, (815) 886-0793.

MOUNTAIN BIKE — Nishiki, 18" frame, bar ends, includes spare tubes & seat pack, fun bike. Must sell. $100 o.b.o. Laurie Culbert, (630) 985-0413.

GARAGE SALE — June 19 & 20, 9 a.m. - 4 p.m., 515 Hamilton Ave., Westmont, located on Ogden, midway between Cass & Route 83. Julie Cramer, (630) 325-9698.

AUTOMOBILES

1996 BLAZER — Black w/tan bottom, fully loaded, 56K miles, one owner, new tires, excellent condition. $16,900. Rich Trzupek, (630) 968-5445.

1985 LINCOLN — Town Car, white w/dark red interior, vinyl roof, 80K miles, one owner, very good condition. Cynthia Hijuelos, (815) 485-6437.

1990 MERCURY — Cougar LS, AT, AC, PS, PB, PW, PDL, alarm, cruise, electronic dash, AM/FM cassette. $4,500 o.b.o. Phil McNamara, (708) 388-5437.

1991 NISSAN — Stanza, excellent condition, 60K miles, AT, all power, AC, AM/FM cassette, new battery & tires. $7,000 o.b.o. Ron Kolzow, (847) 296-8908.

1993 TOYOTA — Camry XLE, 4-door, fully loaded, sunroof, CD player, one owner, well maintained, very clean, new tires & brakes. $9,500 o.b.o. Jodi Von Rox, (630) 968-8334.

1991 MERCURY — Sable, V6, all power, AT, AC, AM/FM cassette, leaving country, must cell. $4,200 or reasonable offer. Ruslan Sanishvili, (630) 910-1128.

1993 CHEVROLET — S-10 Blazer, 4 X 4, Tahoe package, 6 cyl., 4.3 L, AT, PS, PB, PM, PW, PDL, AC, cruise control, tilt steering, AM/FM stereo cassette, velour/cloth seats, new tires, brakes & battery. $11,500. Mark Jilek, (815) 436-0152.

1989 NISSAN — 240 SX, 3-door, hatchback, AT, AC, PS, great condition, 36K miles. $5,000. Levy Ulanovsky, (630) 322-9871.

1988 TAURUS — GL wagon, AT, PS, PB, PW, PL, AM/FM cassette, 87K miles, well maintained, very reliable. $2,700. Gregg Kulma, (630) 810-0270.

1984 HONDA — Accord, 5-speed, 115K miles, 4 door, good condition. $1,000 o.b.o. Jie Guan, (630) 322-8172.

1994 CHEVROLET — GEO tracker, 2 door, 4 wheel drive, AC, flip up/removable top, AM/FM cassette, 83K miles, excellent condition. $6,500. Reginald Alley, (708) 331-7236

1988 FORD - F150 SuperCab Truck, 8' bed with liner, matching Leer bed cap, AC, AM/FM cassette, overdrive, cruise control, Star Craft customized, towing package. $5,400. Douglas Parini, Sr., (815) 744-5501.

1990 HONDA — Accord EX, AT, PS, PB, PW, PDL, AM/FM cassette, 71K miles, well maintained, very reliable. $6,400. Gregg Kulma, (630) 810-0270.

1986 NISSAN — Stanza, AT, PW, 4 door AM/FM cassette, 113.7K miles, new exhaust, new alternator, good condition, must go because of moving. $1,100 o.b.o. Xiaoma Jiang, (630) 455-0242.

HOUSING

LOT/SALE — Lake of the Ozarks. $17,500. Todd Trotter, (630) 261-9750.

TIMESHARE/SALE — Austria. $6,500 & exchangeable. Todd Trotter, (630) 261-9750.

HOUSE/RENT — Ranch, 3 bedrooms, 1 bath, 1-car garage, fireplace, new 6-panel pine bedroom doors w/more upgrades throughout, Wheaton schools, swimming pool, Jacuzzi, pool table & more, easy access to I-88 & shopping. $1,175/month + first months rent & security deposit. Thomas Meier, (630) 393-3688.

LOT/SALE — 44' x 130' lot, 706 Mack St., Joliet, Cathedral area, mature trees. $22,500. Kimberly Herman Perona, (815) 723-8509.

HOUSE/SALE — 708 Mack Street, Joliet, cathedral area, brick bungalow, 2 bedrooms, 1 remodeled bath, full finished basement, additional bedroom, den, enclosed porch, large family room, hardwood floors, CA, freshly painted. $115,000. Kimberly Herman Perona, (815) 723-8509.

ROOM/RENT — 5 miles from Argonne, clean. $450/month. Soenke Seifert, (630) 325-1216.

TOWNHOUSE/SALE — Palos Hills, living in family community, swim, BBQ, tennis, playground, move in condition. $149,000. Corrie Patterson, (708) 974-9924.

HOUSE/SALE — New Lenox, 3 bedrooms, 1 bath ranch w/2 car attached garage, 14 years old, wooded back yard, nice street, excellent schools. $139,000. Mary Donovan, (815) 485-5553.

WANTED

SLIDE PROJECTOR & SCREEN — For donation to the Crisis Pregnancy Center in Joliet, donation form available for taxes. Gloria Griparis, (815) 436-4980.

TEENIE BEANIE BABIES — Looking for numbers 1, 2 & 3. Will purchase or trade for #9 (Bone) or #10 (Nip). Jill Jonkouski, (773) 586-1664.

TO BE GIVEN AWAY

CAT —Young, black tabby, female, 8 months old, 1st set of shots. Michelle Ficner, (708) 352-5177.

ELECTRONIC EQUIPMENT — AT&T 7700 word processor, 1989. HP deskwriter printer for Macintosh computers, temperamental paper feed. Karen Haugen, (630) 852-4828.

MAGAZINES — Cobblestone, 1981 - 1984. National Geographic, 1993 - 1996, Smithsonian, 1994 - 1996, Discover, 1993 - 1996 & some earlier issues. Karen Haugen, (630) 852-4828.

SWING SET — 2 swings, slide, glider, double swing. You dismantle & haul. Julie Emery, (815) 439-0397.